

What is claimed is:

1. A digital transmission system, for producing a replica of a digital signal comprising at least a first component and a second component, comprising:
  2. an encoder including analysis means for altering said digital signal to obtain a plurality of sub-signals, including at least a first sub-signal and a second sub-signal from said first component and said second component respectively,
  3. signal combination means for combining said first sub-signal and said second sub-signal to obtain a composite sub-signal,
  4. signal generator means for generating an indicator signal indicating that said first sub-signal and said second sub-signal are combined,
  5. transmission means for transmitting said indicator signal, said composite sub-signal, and sub-signals which have not been combined,
  6. receiving means for receiving the signals which were transmitted,
  7. means, responsive to the received indicator signal and composite sub-signal, for generating a signal related to at least one of said first component and said second component, and
  8. a decoder including synthesis means for combining the transmitted sub-signals and the signal related to at least one of said first component and said second component to produce said replica of the digital signal.

1. 2. A system as claimed in claim 1, characterized in that said first and second component represent information relating to the stereo nature of an audio signal.
1. 3. A system as claimed in claim 1, characterized in that said analysis means subdivides said digital signal into sub-signals which are subband signals representing respective frequency subbands and said components.
1. 4. A digital transmission system, for producing a replica of a digital signal

2 comprising at least a first and a second component, comprising a transmitter  
3 and a receiver,

4 wherein said transmitter comprises:

5 an encoder including analysis means for filtering said digital signal to  
6 obtain subband signals for M subbands, where  $M > 1$ , said subband signals  
7 including a plurality of first subband signals and a plurality of second subband  
8 signals from said first component and second component respectively,

9 signal combination means for combining  $m_1$  of said first subband signals  
10 respectively with  $m_2$  of said second subband signals from corresponding  
11 subbands to obtain  $m_1$  composite subband signals, where  $1 < m_1 < M$ ,

12 signal generator means for generating an indicator signal indicating which  
13 said first and second subband signals are combined, and

14 transmission means for transmitting said indicator signal, said composite  
15 subband signals, and subband signals which were not combined, and

16 the receiver comprises:

17 receiving means for receiving the signals which have been transmitted,

18 detection means for detecting said indicator signal,

19 derivation means responsive to the received indicator signal, for  
20 producing, from the received composite subband signals, derived subband  
21 signals related to  $m_1$  of said first subband signals and  $m_2$  of said second  
22 subband signals, and

23 a decoder including synthesis means for combining said derived subband  
24 signals and the received subband signals which were not combined, to produce  
25 said replica of the digital signal.

1 5. A system as claimed in claim 4, wherein said analysis means applies  
2 substantially identical filtering to said first and second components to obtain said  
3 first and second subbands.

1       6. A system as claimed in claim 4, characterized in that said  $m_1$  of the first  
2 subband signals are subband signals for the  $m_1$  highest frequency subbands.

1       7. A system as claimed in claim 4, characterized in that said digital signal  
2 represents a first block of samples and a second block of samples, said first  
3 component and said second component being first block first and second  
4 components, said subband signals being first block subband signals, said  $m_1$  of  
5 said first and second subband signals being  $m_1$  of the first block first and second  
6 subband signals, said  $m_1$  composite subband signals being  $m_1$  first block  
7 composite subband signals, and said replica being a replica of the portion of said  
8 digital signal representing said first block of samples,

9                  for producing a replica of the portion of said digital signals representing  
10 said second block of samples, said analysis means obtains second block  
11 subband signals for said  $M$  subbands including corresponding pluralities of  
12 second block first and second subband signals from second block first and  
13 second components respectively,

14                  said signal combination means combines in each of a number  $m_2$   
15 subbands the second block subband signals from the respective second block  
16 first and second components, to obtain  $m_2$  composite signals in said  $m_2$   
17 subbands, where  $m_2$  is greater than  $m_1$ ,

18                  said signal generator means generates a second block indicator signal  
19 identifying said  $m_2$  subbands,

20                  said transmitter transmits said composite signals in said  $m_2$  subbands,  
21 said second block indicator signal, and second block subband signals which  
22 were not combined, and

23                  said derivation means derives said  $m_2$  composite signals in said  $m_2$   
24 subbands from the second block signal received, and derives from said  $m_2$   
25 composite signals in said  $m_2$  subbands, in response to said second block  
indicator signal, subband signals in said  $m_2$  subbands corresponding to said

27 ~~second block subband signals which were combined.~~

1       8. A system as claimed in claim 7, characterized in that said  $m_2$  subbands  
2       are the  $m_2$  highest subbands.

1       9. A system as claimed in claim 6, characterized in that said first and second  
2       components are respective stereo audio signals.

1       10. A system as claimed in claim 4, characterized in that said transmitter  
2       comprises a scale factor determiner, for determining a scale factor for time  
3       equivalent subband signal blocks of the first and second components in the  
4       subband signals; and means for transmitting these scale factors, and  
5                  said detector in the receiver is adapted to detect the scale factors which  
6       have been transmitted.

1       11. A system as claimed in claim 2, characterized in that said transmitter  
2       comprises means for quantizing the time equivalent signal blocks of the subband  
3       signals and the one or more composite signals.

1       12. A transmitter, for transmitting signals representative of a digital signal  
2       comprising at least a first component and a second component, over a  
3       transmission medium, comprising:

4                  an encoder including analysis means for altering said digital signal to  
5       obtain a plurality of sub-signals, including at least a first sub-signal and a second  
6       sub-signal from said first component and said second component respectively,  
7                  signal combination means for combining said first sub-signal and said  
8       second sub-signal to obtain a composite sub-signal,

9                  signal generator means for generating an indicator signal indicating that  
10      said first sub-signal and said second sub-signal are combined,

11                   transmission means for transmitting said indicator signal, said composite  
12                   sub-signal, and sub-signals which have not been combined.

1                   13. A transmitter as claimed in claim 12, characterized in that said first and  
2                   second components are respective stereo audio signals.

1                   14. A transmitter as claimed in claim 12, characterized in that said analysis  
2                   means filters said digital signal to provide sub-signals which are subband signals  
3                   representing said digital signal in M respective frequency subbands, where  $M >$   
4                   1, said subband signals including a plurality of first subband signals and a  
5                   plurality of second subband signals from said first component and second  
6                   component respectively,

7                   said signal combination means combines  $m_1$  of said first subband signals  
8                   respectively with  $m_1$  of said second subband signals from corresponding  
9                   subbands to obtain  $m_1$  composite subband signals, where  $1 < m_1 < M$ , and  
10                  said indicator signal indicates which said first and second subband signals  
11                  are combined.

1                   15. A transmitter as claimed in claim 14, characterized in that said digital  
2                   signal represents a first block of samples and a second block of samples, said  
3                   first component and said second component being first block first and second  
4                   components, said subband signals being first block subband signals, said  $m_1$  of  
5                   said first and second subband signals being  $m_1$  of the first block first and second  
6                   subband signals, said  $m_1$  composite subband signals being  $m_1$  first block  
7                   composite subband signals, and said replica being a replica of the portion of said  
8                   digital signal representing said first block of samples,

9                   for producing a replica of the portion of said digital signals representing  
10                  said second block of samples, said analysis means obtains second block  
11                  subband signals for said M subbands including correspondingly pluralities of

12 second block first and second subband signals from second block first and  
13 second components respectively,

14 said signal combination means combines in each of a number  $m_2$   
15 subbands the second block subband signals from the respective second block  
16 first and second components, to obtain  $m_2$  composite signals in said  $m_2$   
17 subbands, where  $m_1 < m_2 \leq M$ ,

18 said signal generator means generates a second block indicator signal  
19 identifying said  $m_2$  subbands, and

20 said transmission means transmits said  $m_2$  composite signals, said second  
21 block indicator signal, and second block subband signals which were not  
22 combined.

1 16. A transmitter as claimed in claim 14, wherein said analysis means applies  
2 substantially identical filtering to said first and second components to obtain said  
3 first and second subbands.

1 17. A transmitter as claimed in claim 14, characterized in that said  $m_1$  of the  
2 first subband signals are subband signals for the  $m_1$  highest frequency  
3 subbands.

1 18. A transmitter as claimed in claim 14, characterized in that said  
2 transmitter comprises a scale factor determiner, for determining a scale factor  
3 for time equivalent subband signal blocks of the first and second components in  
4 the subband signals; and means for transmitting these scale factors.

1 19. A receiver for producing a replica of a digital signal including a first  
2 component and a second component, from digital signal components comprising  
3 at least one composite sub-signal, an indicator signal indicating that at least a  
4 first and a second sub-signal are combined, and a plurality of subsignals not

5 including said first and second sub-signal, said digital signal components being  
6 representative of said digital signal,  
7 receiving means for receiving said digital signal components,  
8 means, responsive to the received indicator signal and composite sub-  
9 signal, for generating a signal related to at least one of said first component and  
10 said second component, and  
11 a decoder including synthesis means for combining the transmitted sub-  
12 signals and the signal related to at least one of said first component and said  
13 second component to produce said replica of the digital signal.

1 20. A receiver as claimed in claim 19, characterized in that said first and  
2 second components are respective stereo audio signals.

1 21. A receiver as claimed in claim 19, characterized in that said composite  
2 sub-signal represents a first subband signal and a second subband signal for a  
3 combined subband, and said sub-signals are subband signals representing  
4 respective frequency subbands other than said combined subband, and  
5 said means for generating comprises derivation means for deriving said  
6 composite subsignal from the signal received and for deriving from said  
7 composite signal, in response to the indicator signal, subband signals  
8 corresponding to said first component and said second component.

1 22. A receiver as claimed in claim 21, characterized in that the digital signal  
2 components comprise a plurality of said composite sub-signals representing a  
3 plurality of combined subbands respectively, and a scale factor for time  
4 equivalent signal blocks of the first component and the second component,  
5 said detector in the receiver is adapted to detect said scale factor, and  
6 said derivation means is responsive to said scale factor.

1           23. An encoder for encoding one or more input signals, comprising  
2           steering means responsive to said one or more input signals for generating  
3           a composite signal having its frequency spectrum in a plurality of  
4           frequency bands, or  
5           one or more individual signals and, under certain conditions, a  
6           composite signal, said one or more individual signals and said composite  
7           signal having their respective frequency spectra in one frequency band or  
8           in a plurality of frequency bands, and  
9           control means responsive to said steering means for generating a steering  
10          control signal having one or more components relating to said one frequency  
11          band of said second-recited composite signal or said plurality of frequency bands  
12          of said first or second-recited composite signal.

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